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LEAD-BASED PAINT AND SOIL SAMPLING:

PARCEL "A" QUARTERS HUNTERS POINT NAVAL BASE

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Prepared for:

**Western Division Naval Facilities Engineering Command
San Bruno, CA**

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TETRA TECH

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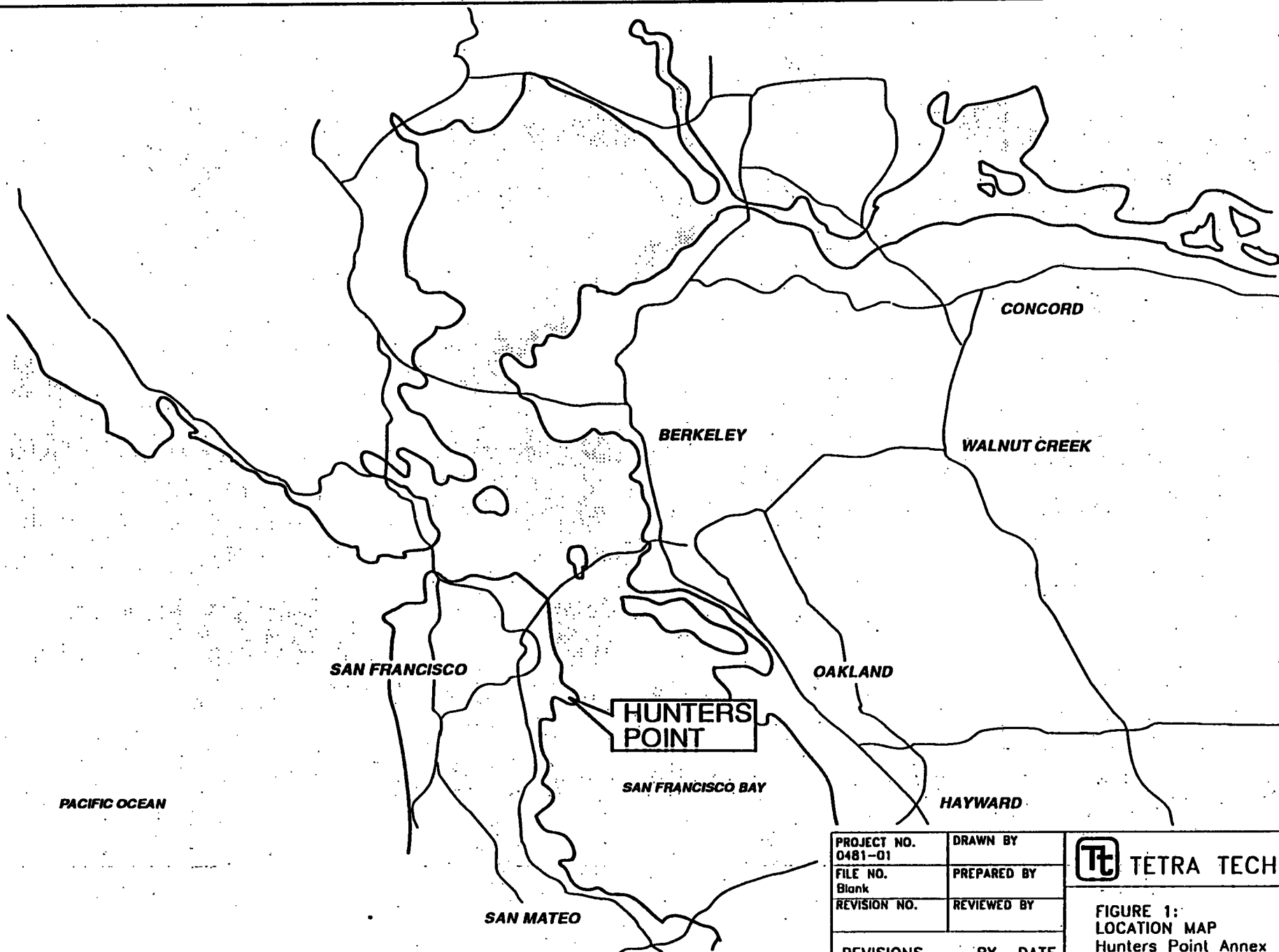
I.0 PURPOSE AND INTRODUCTION

The purpose of this document is to present the results of a lead-based paint and soil survey for eight housing units, two community areas, and the water tank at Hunters Point Naval Shipyard, Parcel A. The survey was designed according to the guidelines provided by Part II of the *Federal Register*, June 29, 1992, hereafter referred to as the Housing and Urban Development, Notice of Funding Availability Document (HUD NOFA). Because these quarters are not currently occupied and have not been occupied for several years, some of the HUD NOFA procedures are not applicable. Nevertheless, this survey was designed to follow the referenced guidelines as closely as possible, given the differing site conditions and management objectives. Because the housing units and Parcel A are not likely to be reoccupied, this survey concentrated on soil surrounding the homes and on exterior painted surfaces. The principle focus of the soil sampling at these facilities was to identify soils that exceed background concentrations of lead.

Table I lists the building sampled and Figure 1 depicts the locations of the buildings and areas sampled. Appendix A provides drawings of each building and gives sample locations and results. Appendix B provides photodocumentation of the lead-based paint sample locations.

2.0 LOCATION

The locations of the units to be tested are shown in Figures 1 and 2. All of the housing units were purchased by the Navy about 40 years ago, and have few, if any, similarities in design. Therefore, the units are being treated as separate, individual structures, and the results are reported separately for each of the subject properties. The eight housing units sampled are the same as those units investigated in the Field Investigation of Structures at Hunter's Point Parcel A (Tetra Tech, 1993). These buildings were chosen randomly from 35 housing units on Parcel A, and were approved by WestDiv and Treasure Island personnel prior to inspection and sampling. For common area samples, the playground at the southeastern corner of Friedel and Jerrold Avenues, and the Public Works Yard at the northern corner of Coleman and Jerrold Avenues were sampled. The community water tank was also sampled. Figure 1 illustrates the location of the area sampled. Table 1 gives the address of each unit.



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FIGURE 1:
LOCATION MAP
Hunters Point Annex
California

TABLE I
PROPERTIES SAMPLED AT
HUNTER'S POINT: PARCEL A
JULY 21, 1993

1. Quarters L, 522 Kirkwood Avenue.
2. R-105, 565 Jerrold Avenue.
3. R-95, 550 Jerrold Avenue.
4. Quarters B, 530 Jerrold Avenue.
5. Quarters O, 543 Innes Avenue.
6. Quarters T, 560 Innes Avenue.
7. Quarters X, 533 Hudson Avenue.
8. Quarters I, 510 Hudson Avenue.
9. Playground Common Area.
10. Water Tank Perimeter.
11. Public Works Yard.

3.0 SAMPLING METHODS FOR SITE SOILS

3.1 SURVEY PROCEDURES FOR THE PORTABLE SPECTRUM XRF MACHINE

Tetra Tech used a *Sci Tec* portable spectrum X-Ray Florescence Spectrophotometer (hereafter referred to as an XRF) to screen the soil samples at each location. The XRF permitted the rapid analysis of soil samples. However, the limitations of the instrument include:

- the need for repeated calibration because of the differing sample densities of the soil and the resultant scattering effects from the surrounding media;
- the need for additional time to survey because of compensation for the diffusion of photons by the soil matrix and variability in the density of the substrate; and
- less accurate results than information produced during sample analysis by atomic absorption spectrophotometry (AAS). (However, the XRF makes possible a representative survey that would be prohibitively expensive if the AAS method were used exclusively.)

3.1.1 Sampling and Measurement

The XRF is a field portable, energy-dispersive spectrometer. It is hand-held, self-contained, battery powered, and weighs 8.5 pounds. These characteristics, and the fact that it is hermetically sealed and can therefore be decontaminated, allow operation directly on-site. X-ray fluorescence is induced by a low-intensity Cd^{109} , Am^{241} , or Co^{57} gamma ray source, which is housed with a solid state detector in the sampling probe ("scanner"). Operational safety is maintained by a shutter approved by the Nuclear Regulatory Commission.

Analysis with the XRF involves placing the scanner in direct contact with the sampling medium

and opening the shutter with a key. Fluorescent X-ray photons are counted during a user-specified period of time by a counting circuit and classified into discrete energy levels by a multichannel analyzer to produce a spectrum characteristic of the elements in the sampling medium. Net intensities for each target element are calculated and converted to concentration values by means of a calibration model. This model is derived empirically by measuring the net intensities of the target elements in a set of calibration standards, and fitting a linear function that relates net intensity to concentration by a multiple regression procedure.

As is the case with all XRF systems, the relationship between net intensity and concentration varies with the characteristics of the sample matrix. In the case of solid, inhomogeneous particulate media, such as soils or sludges, the concentration-intensity relationship is particularly influenced by variability in the grain size distribution, bulk density, and the geometric relationships between discrete grains containing the target element(s) and the detector. Net intensities can be enhanced or absorbed by certain non-target elements that may be present. Because data quality can be significantly influenced by any or all of these, matrix effects must be taken into account in the calibration procedure.

3.2 PROCEDURE FOR SOIL SAMPLING

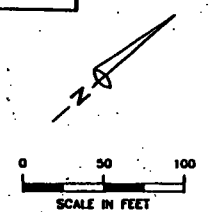
To confirm the highest XRF concentration at a site, a soil sample was collected for lab analysis using Atomic Absorption Spectrophotometry (EPA Method 7420) for each home or property location. Procedures are outlined below.

- a. the selected sampling site reflected the highest lead concentration by XRF.
- b. a clean trowel was used to collect about ten grams of surface soil (not greater than one inch deep) from the selected site. Soil samples did not include growing vegetation.
- c. a clean pair of disposable latex gloves was worn by personnel to prevent cross contamination.
- d. organic matter or a surface mat of decayed grass or leaves was not discarded lead is

usually adsorbed more strongly on organic matter than inorganic soil. Samples of soil were taken from the surface, no more than one inch deep because lead sourced from lead-based paint is deposited on the surface of the soil and is persistent. Also, surface soils are those most likely to be disturbed by future owners and occupants of the properties.

- e. the soil sample was placed in a clean "Whirl-Pack" plastic bag, which was sealed securely.
- f. the bag was labeled with the location of the sample, and the date the sample was taken.
- g. the sampling trowel was decontaminated between each sample.

In cases where there was evidence to suggest uniformly high concentrations of lead in soil and the objective was to evaluate the typical lead exposure in the area surrounding the property, a "representative" composite sample was obtained from four samples taken from the front, side, and rear of the site. This procedure was used for the water tank. Table 2 presents the sample results of soils by EPA Method 7420 and by XRF. Soil samples analyzed by EPA Method 7420 were generally duplicates taken for quality assurance purposes.



Quarters Area, Hunters Point



TABLE 2
SOIL SAMPLE RESULTS

Building Number	Sample Number	XRF Result ppm	Sample Number	EPA Method 7420 Duplicate (ppm)
Quarters L	LX-002	230	N/A	Not Taken
	LX-003	248	N/A	Not Taken
	LX-004	213	N/A	Not Taken
	LX-005	256	LS-002	150
	N/A	Not Taken	LS-001	150
105 R-103	PX-002	154	N/A	None Taken
	PX-003	190	PS-001	2700
	PX-005	165	N/A	None Taken
Playground	PGX-001	170	PGS-001	110
R-95	RX-001	160	RS-001	200
	RX-002	160	N/A	Not Taken
	RX-003	150	N/A	Not Taken

Quarters	BX-001	179	N/A	Not Taken
B	BX-004	197	BS-001	240
Public Works Yard	PWX-001	167	PWS-001	250
Quarters	OX-002	208	05-001	92
O	OX-003	158	N/A	Not Taken
Quarters	TX-002	182	TS-001	210
T	TX-003	152	N/A	Not Taken
Quarters	IX-002	157	N/A	Not Taken
I	IX-003	159	TS-001	120
Quarters	XX-002	193	N/A	Not Taken
X	XX-003	223	XS-001	53
Water Tank	N/A	Not Taken	Composite Soil Sample	815

3.3 DISCUSSION OF RESULTS

Soil analyzed by XRF had a lead concentration range of 154 to 250 ppm, with an average concentration of 185 ppm and a standard deviation of 32. Confirmation soil samples analyzed by Atomic Absorption had a range of 53 to 2700, with an average concentration of 388 and a standard deviation of 789. However, with the elimination of Sample # PS-001, which appears to be erroneous (2700 ppm), the average concentration is reduced to 157.5 with a standard deviation of 66.

This general range of lead in soil is within generally acceptable levels; however, the highest level of lead found (815 ppm at the water tank) is substantially above the generally acceptable level of lead in soil. The U.S. EPA and Cal EPA have not set standards for lead in soil. When disposing of soil in California, 1,000 ppm lead is considered hazardous waste according to California Code of Regulations, Title 27, §66699. Clean-up levels for lead are generally set below 500 ppm; actual clean-up levels are determined by health based risk assessments.

4.0 SAMPLING METHODS FOR PAINTED SURFACE

Ideally, all painted surfaces inside and outside a home should be tested for lead to determine whether or not lead paint hazards exist and where they are located. However, because reoccupancy at the subject properties is not likely, the focus of this investigation was to determine the lead content of the surfaces that are most likely to flake or peel during demolition or remodeling work. Because many of these properties have not been occupied or maintained for some time, each of these eight units had several painted surfaces likely to peel or flake during demolition. These surfaces were sampled according to the following procedures:

- Samples of about one square centimeter or more of the paint were collected and placed in a ziplock bag.
- A sample label, indicating paint condition, paint color, multiple layers, sample number, sample time/date, and sampler, was filled out and placed in the bag.
- The sample location was identified on a simple diagram of the house.
- A photograph of the sample location was taken.

Table 3 present key information for paint samples taken at each of the buildings and percent lead content as measured by EPA Method 7420.

**TABLE 3
PAINT SAMPLE RESULTS**

Building	Sample Number	Layers	Color	Condition	Dust	Result
L	L-1	2	Yellow, White	Chipped	Yes	11%
	L-2	2	White, Sky blue	Chipped	Yes	.24%
	L-3	2	Beige, White	Chipped	Yes	.25%
R-105	1	2	Blue, White	Fair	Yes	19%
	2	1	Beige	Good	Yes	.47%
	3	3	Yellow, Green, Blue	Good	Yes	.38%
	4	1	Dark Beige	Fair	Yes	1.8%
	5	1	White	Good	Yes	.13%
R-95	1	>1	White	Poor	Yes	2.1%
	2	2	Yellow, Brown	Poor	Yes	26%
	3	2	Grey, Yellow	Poor	Yes	.36%
	4	>1	Beige	Variable	Yes	.15%
B	1	2	White, Beige	Poor	Yes	.27%
	2	1	Yellow	Poor	Yes	.38%
	3	1	Beige	Poor	Yes	.8%
	4	1	Grey	Poor	Yes	.23%
O	1	3	White, Beige, White	Poor	Yes	3.1%
	2	4	White, Red, Green, Beige	Poor	Yes	.37%
	3	4	Blue, Green, Pink, Beige	Poor	Yes	.16%
	4	4	Beige, Yellow, Green, Blue	Poor	Yes	.30%
	5	1	Yellow	Good	Yes	4.5%

T	1	1	White	Good	No	1.2%
	2	2	White/Beige	Good	No	10%
	3	2+	White	Chipped	No	25%
	4	2	White	Chipped	No	.21%
	5	2	Beige	Good	No	.31%
X	1	2	Brown	Chipped	Yes	15%
	2	2	White, Blue	Chipped	Minor	.11%
	3	2	White, Green	Chipped	Minor	ND
	4	1	Blue	Chipped	Yes	.76%
	5	1	Tan	Peeling	No	.37%
	6	2+	Yellow, Green	Chipped	Yes	.47%
I	1	2+	White, Green	Chipped	Yes	.62%
	2	2+	White, Green	Chipped	Yes	.38%
	3	1	Pink	Chipped	Yes	.26%

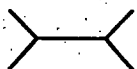
APPENDIX A

Building Drawings

Fridell Avenue

Jerrold Avenue

- PGSX-001 Soil (170ppm)
- PGSS-001 Soil 110ppm

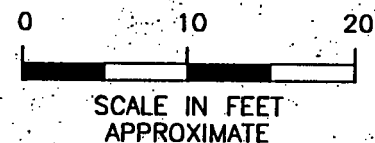


(swing set)

Kirkwood Avenue

LEGEND

PX-001	XRF Sample Location
PS-001	AA Sample Location
(220PPM)	XRF Sample Result
220PPM	AA Sample Result



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REVISIONS	BY DATE

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PLAYGROUND -Lead Sampling
Locations and Results
Hunters Point
California

Innes Avenue

Composite
Tank
Sample
815ppm

WATER
TANK

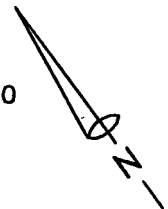
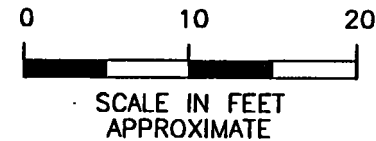
Public
Works
Area

- PWX-001, Soil (167ppm)
- PWS-001, Soil 250ppm

Coleman St.


LEGEND

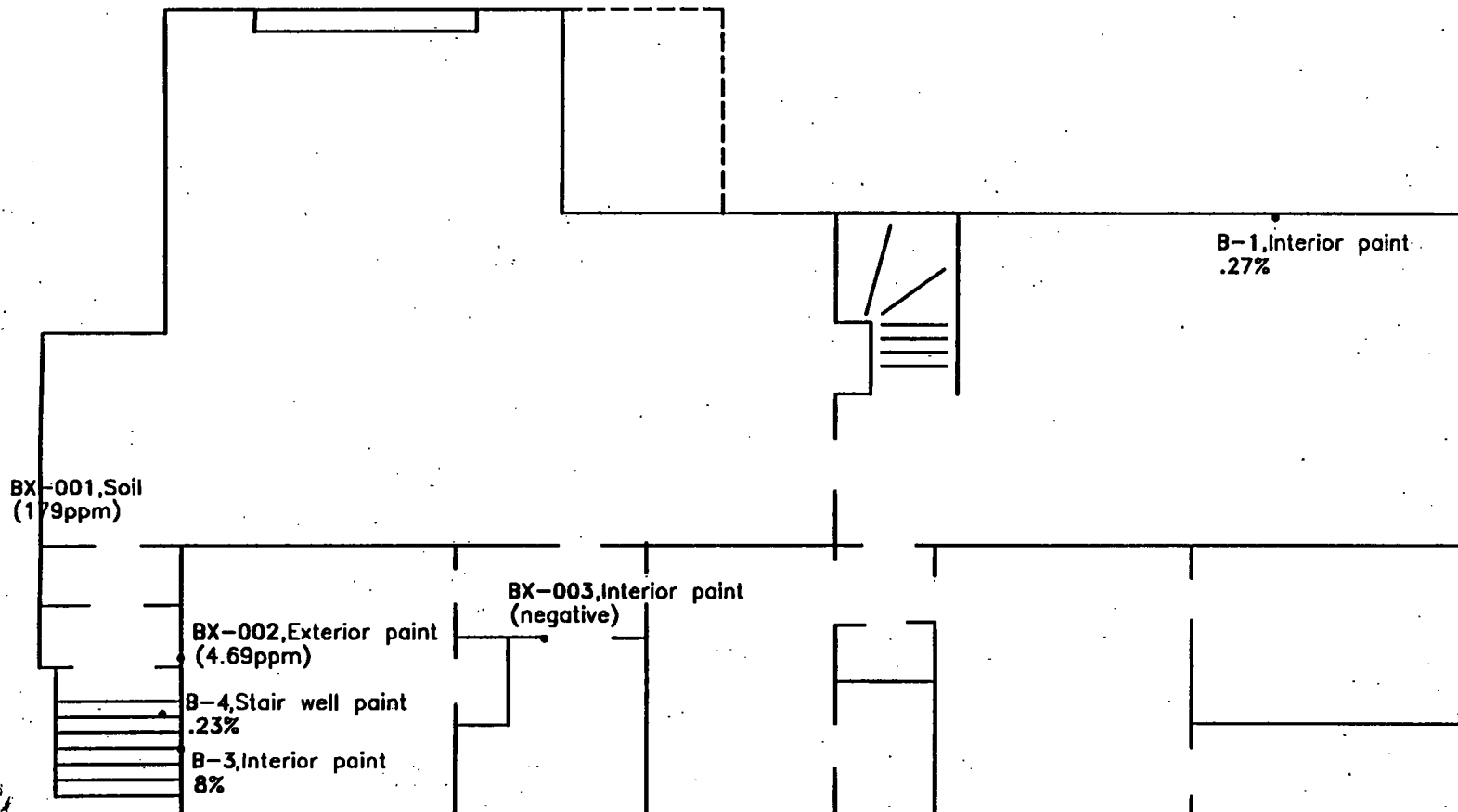
PX-001	XRF Sample Location
PS-001	AA Sample Location
(220PPM)	XRF Sample Result
220PPM	AA Sample Result



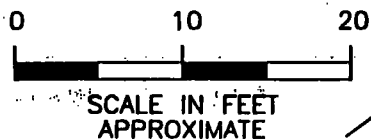
Jerrold Avenue

TANK

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BUILDING B
FIRST FLOOR



LEGEND

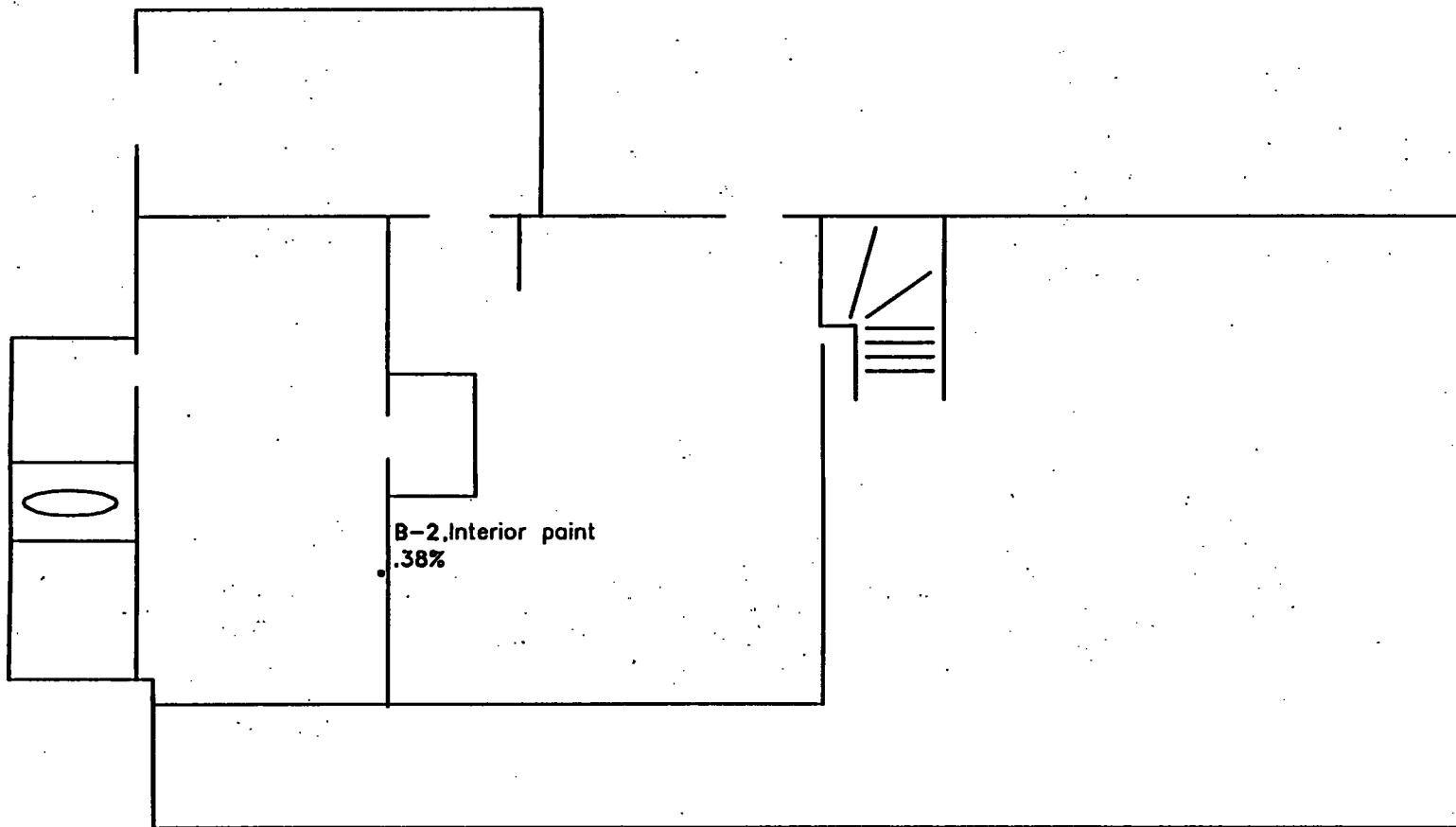
PX-001	XRF Sample Location
PS-001	AA Sample Location
(220PPM)	XRF Sample Result
220PPM	AA Sample Result

BX-004, Soil
(197ppm)
BS-001, Soil
240ppm

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REVISIONS	BY	DATE

Tt TETRA TECH, INC.

**BUILDING B - Lead Sampling
Locations and Results
Hunters Point
California**



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SCALE IN FEET
APPROXIMATE

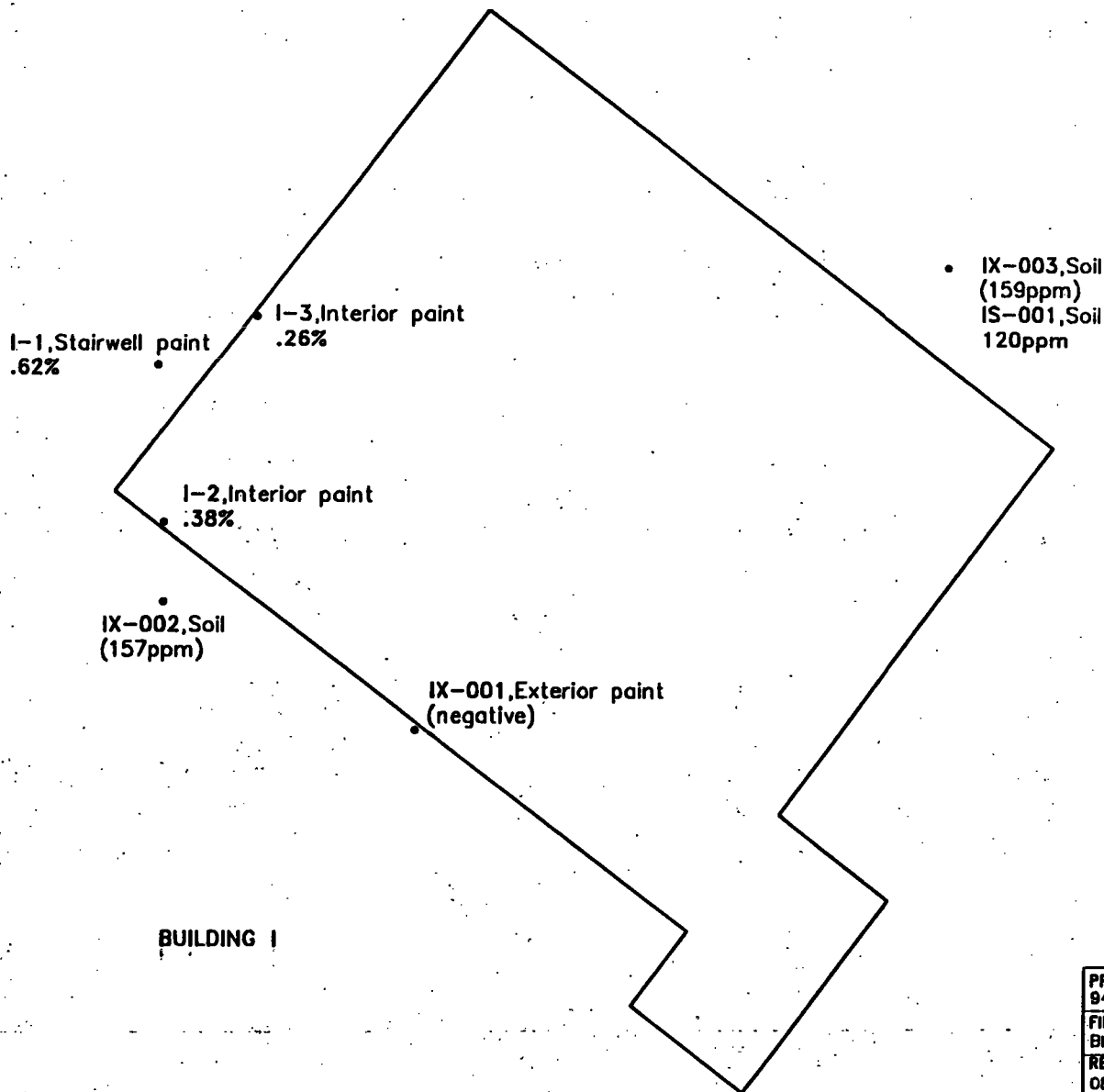
**BUILDING B
BASEMENT**

LEGEND
PX-001 XRF Sample Location
PS-001 AA Sample Location
(220PPM) XRF Sample Result
220PPM AA Sample Result

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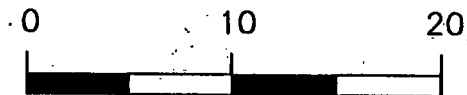
Tt TETRA TECH, INC.

**BUILDING B - Lead Sampling
Locations and Results
Hunters Point
California**




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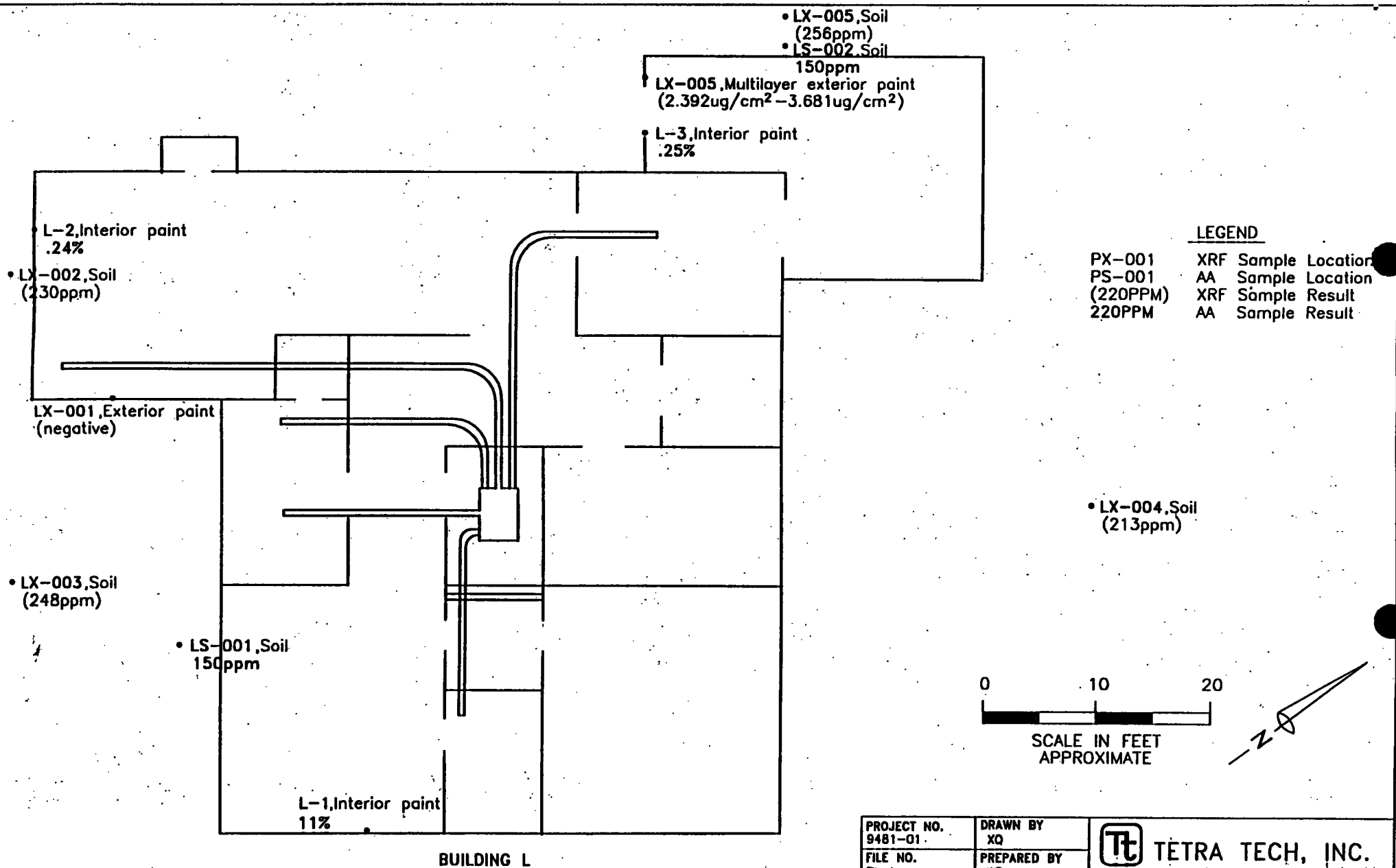
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PS-001	AA	Sample	Location
(220PPM)	XRF	Sample	Result
220PPM	AA	Sample	Result




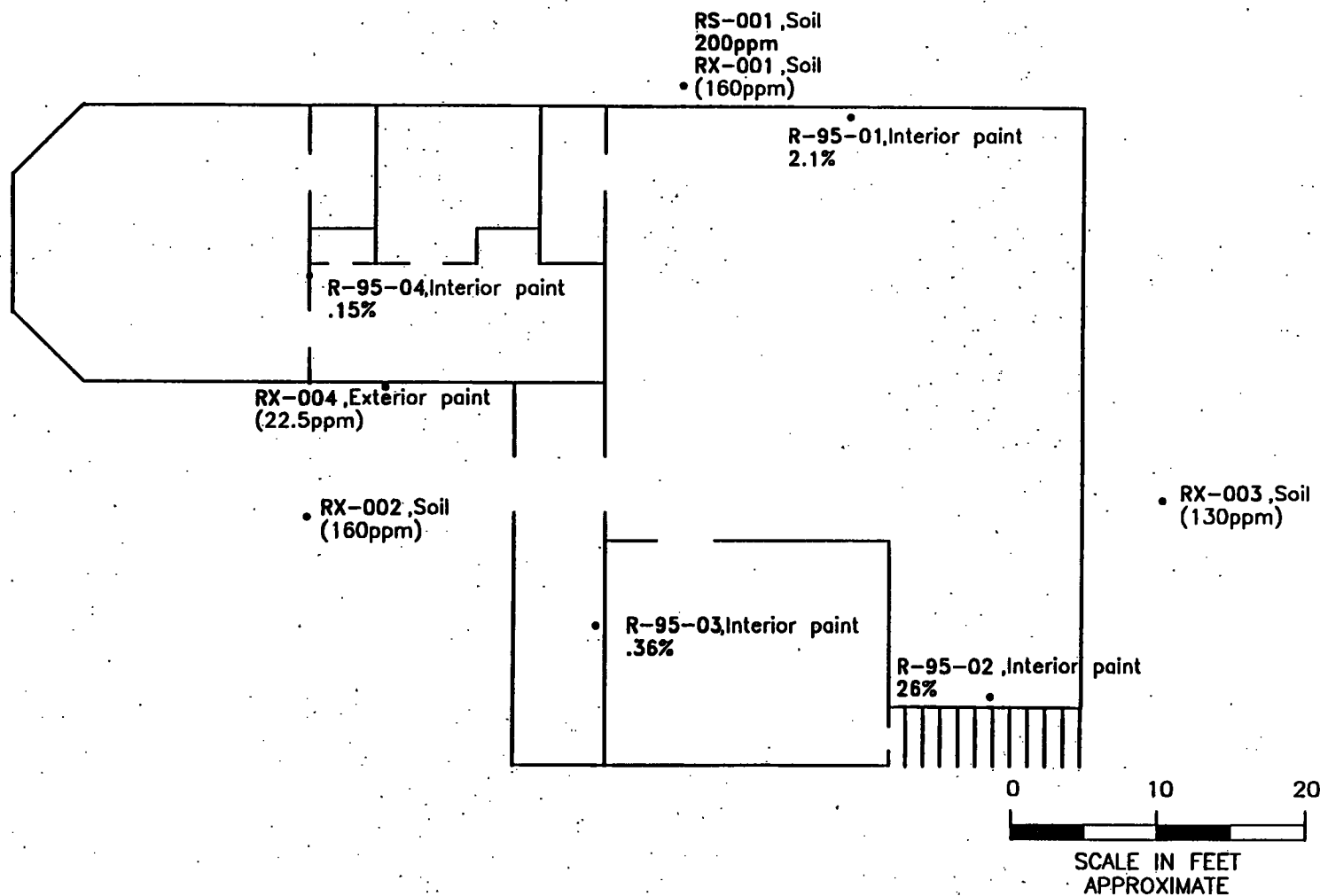
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		SHEET 1 OF 1



BUILDING R-95

PX-001
PS-001
(220PPM)
220PPM

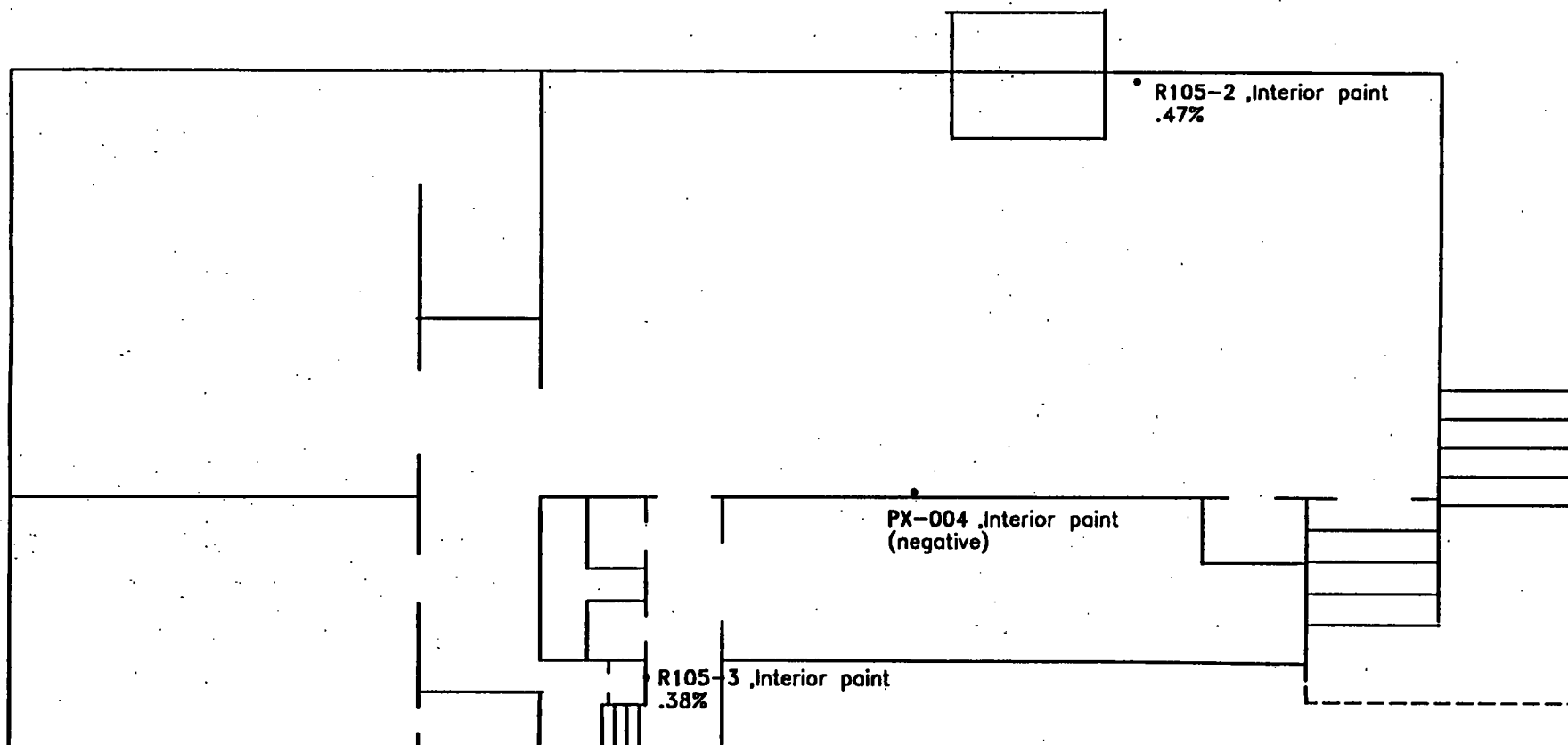
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XRF Sample Location
AA Sample Location
XRF Sample Result
AA Sample Result

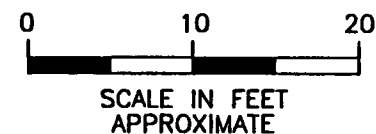
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**BUILDING R-95 - Lead
Sampling Locations and Results
Hunters Point
California**

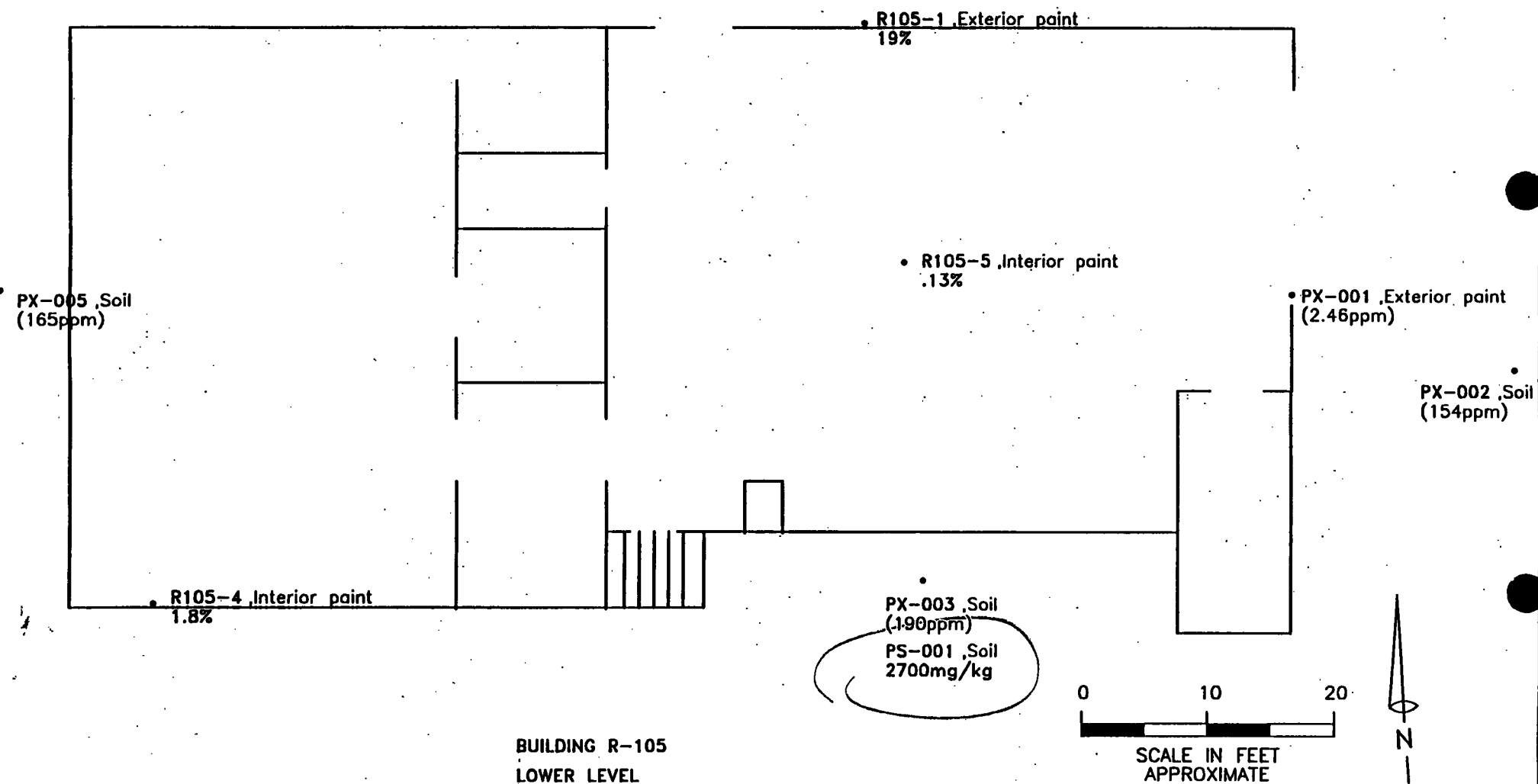


**BUILDING R-105
UPPER LEVEL**



LEGEND	
PX-001	XRF Sample Location
PS-001	AA Sample Location
(220PPM)	XRF Sample Result
220PPM	AA Sample Result

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	BY DATE	



LEGEND

PX-001	XRF Sample Location
PS-001	AA Sample Location
(220PPM)	XRF Sample Result
220PPM	AA Sample Result

PROJECT NO. 9481-01		DRAWN BY XQ		Tt TETRA TECH, INC.
FILE NO. BL-R105B		PREPARED BY WB		
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• OX-003 ,Soil
(158ppm)

• 0-3,Interior paint
.16%

• 0-4 ,Interior paint
.30%

• OX-002 ,Soil
(208ppm)
OS-001 ,Soil
92ppm

• 0-5 ,Exterior paint
4.5%

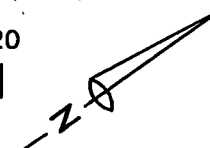
OX-001 ,Exterior paint
(negative)

• 0-2 ,Interior paint
.37%

• 0-1 ,Interior paint
3.1%



SCALE IN FEET
APPROXIMATE



BUILDING 0

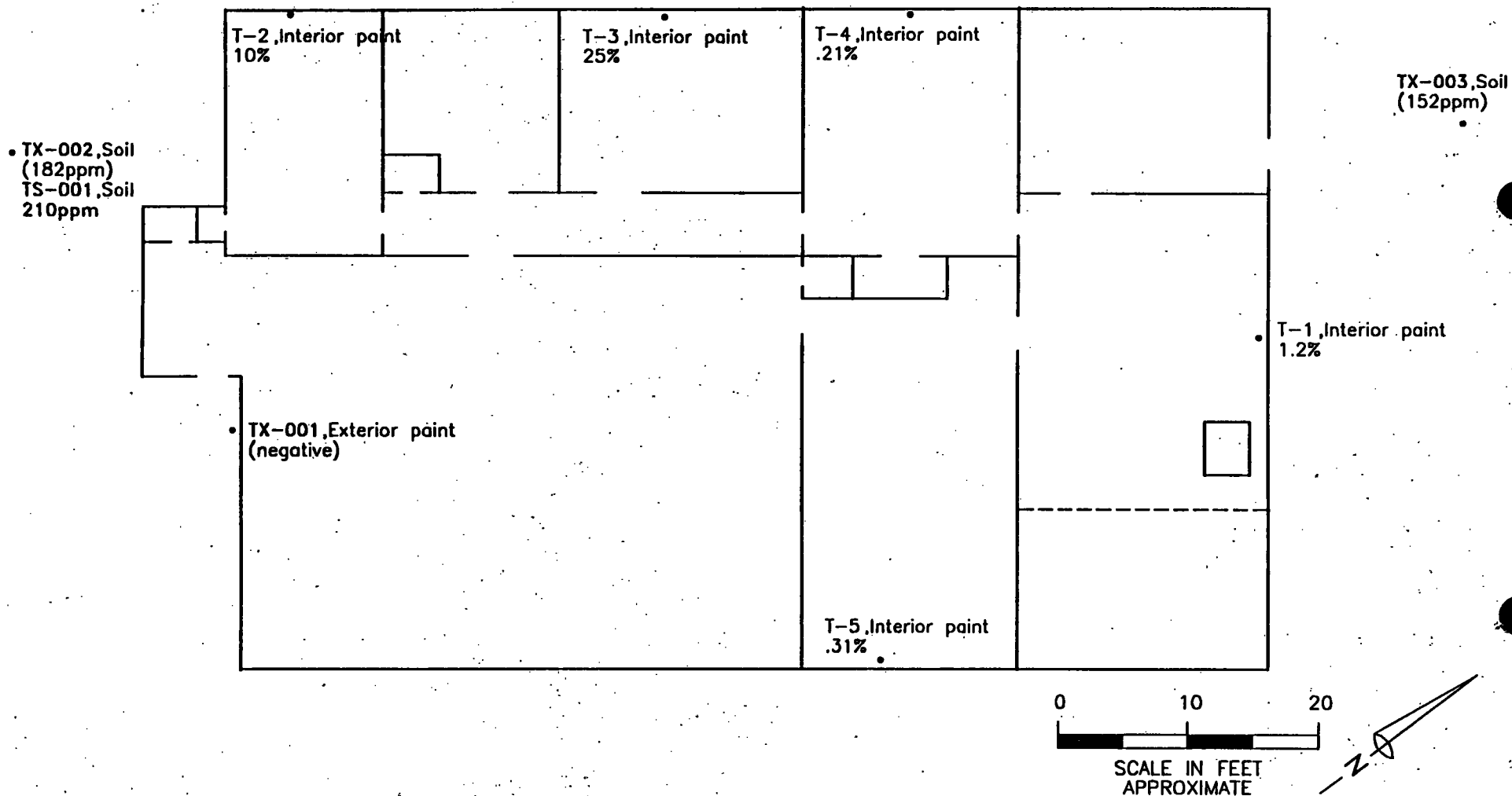
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PX-001	XRF Sample Location
PS-001	AA Sample Location
(220PPM)	XRF Sample Result
220PPM	AA Sample Result

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Tt TETRA TECH, INC.

BUILDING 0 - Lead
Sampling Locations and Results
Hunters Point
California



BUILDING T

PX-001	XRF Sample Location
PS-001	AA Sample Location
(220PPM)	XRF Sample Result
220PPM	AA Sample Result

LEGEND

PROJECT NO. 9481-01	DRAWN BY XQ	Tt TETRA TECH, INC.
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BUILDING T - Lead
Sampling Locations and Results
Hunters Point
California

XX-002, Soil
(193ppm)

X-1, Interior paint
.15%

X-6, Interior paint
.47%

X-2, Exterior paint
.11%

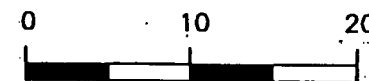
X-5, Interior paint
.37%

X-4, Interior paint
.76%

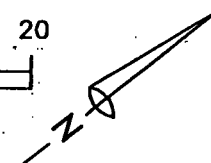
X-3, Interior paint
ND

XX-001, Exterior point
(negative)

• XX-003, Soil
(223ppm)
XS-001, Soil
53ppm



SCALE IN FEET
APPROXIMATE



BUILDING X

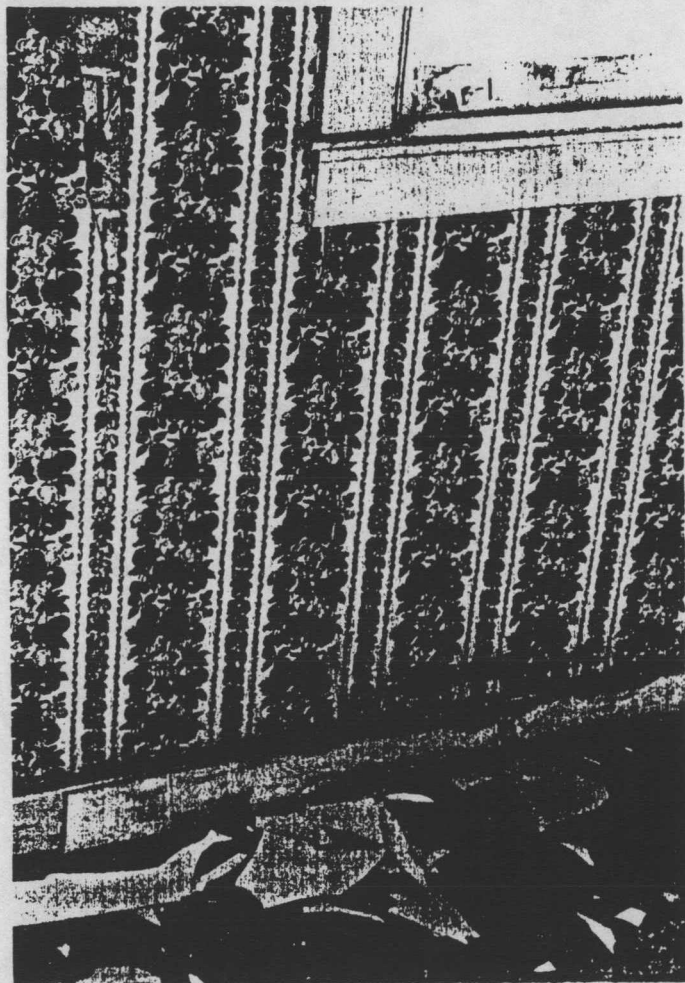
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PX-001	XRF Sample Location
PS-001	AA Sample Location
(220PPM)	XRF Sample Result
220PPM	AA Sample Result

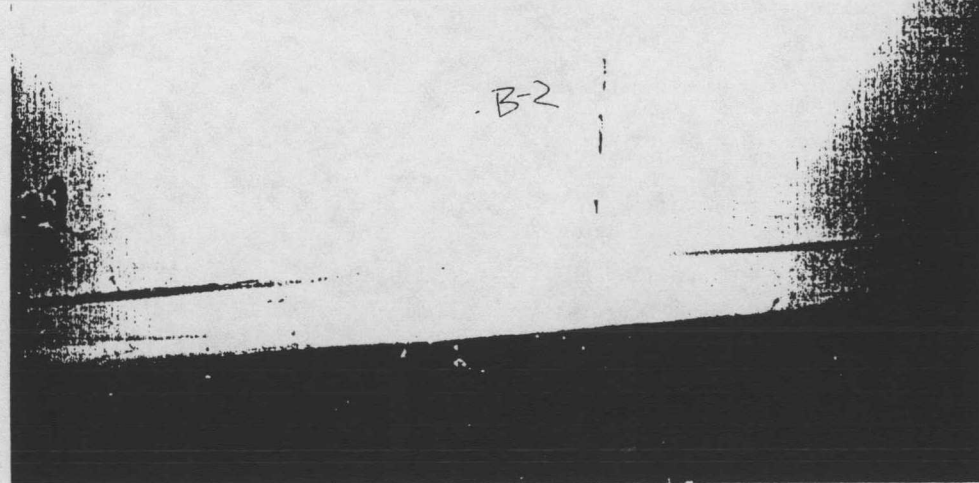
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APPENDIX B

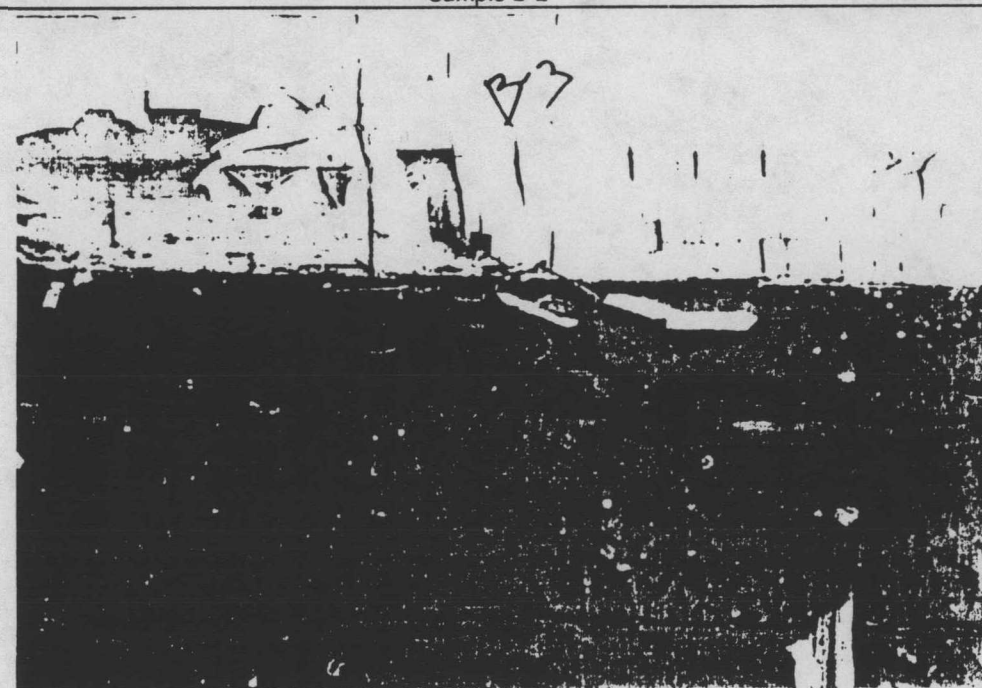
Photodocumentation



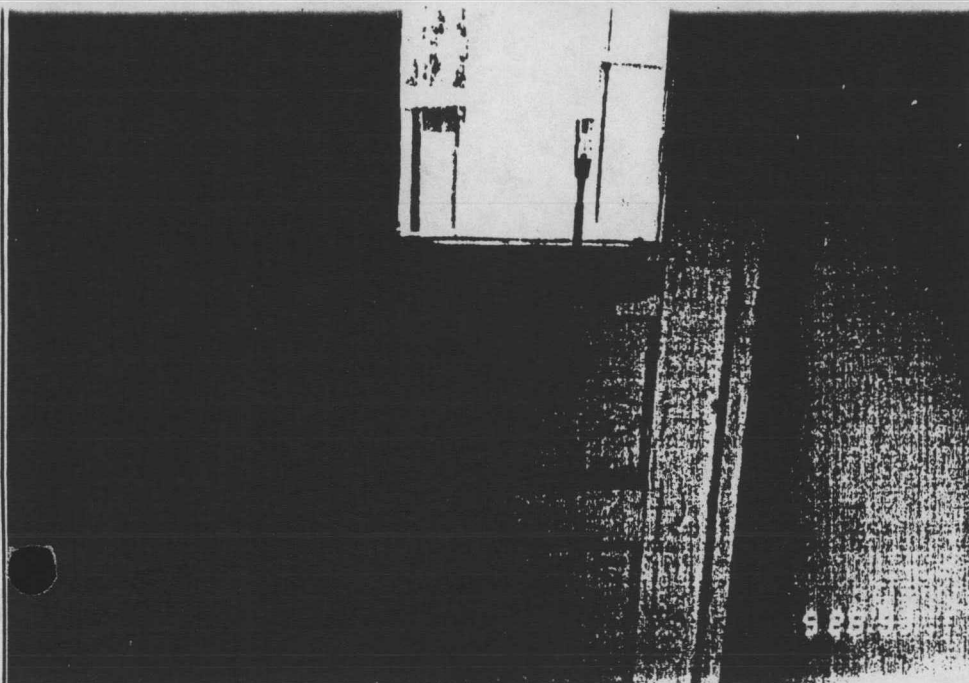
Sample B-1



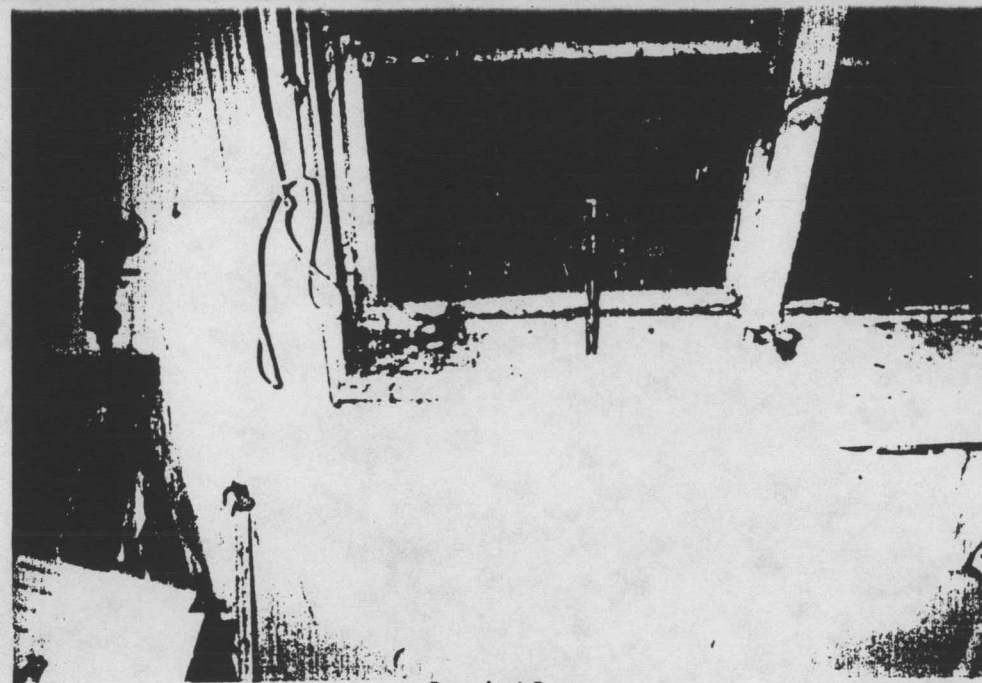
Sample B-2



Sample B-3 & B-4



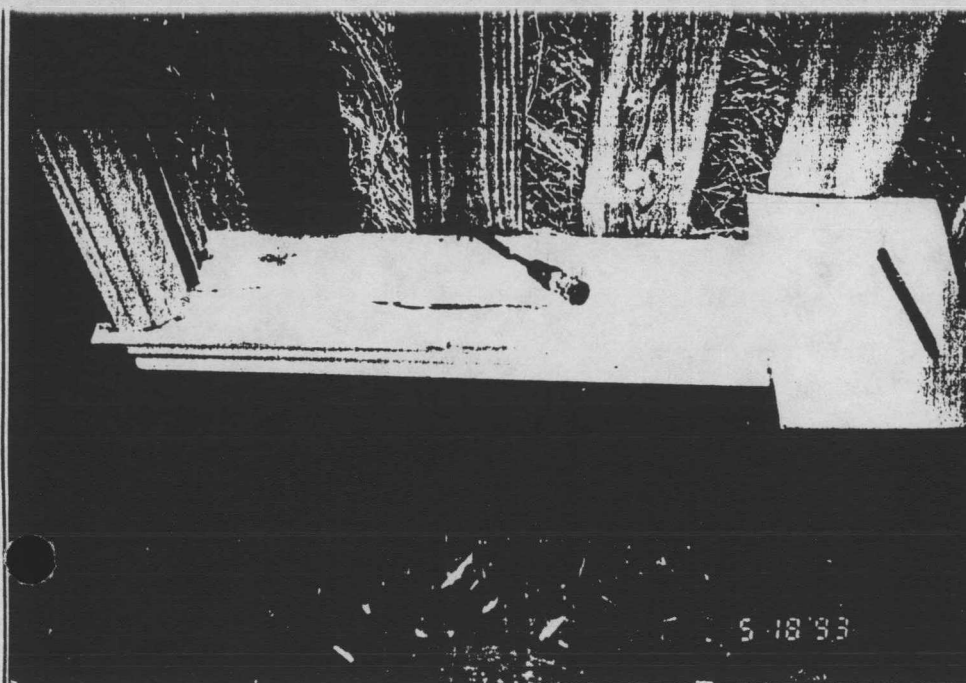
Sample I-1
Interior of door on side porch; white over green paint



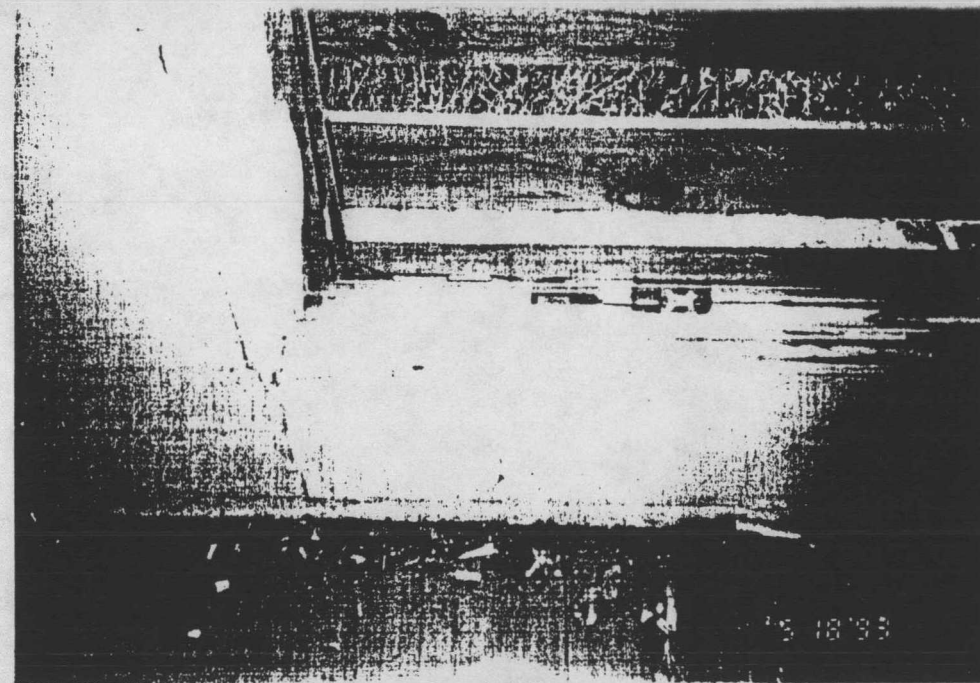
Sample I-2
Northwest window sill in kitchen



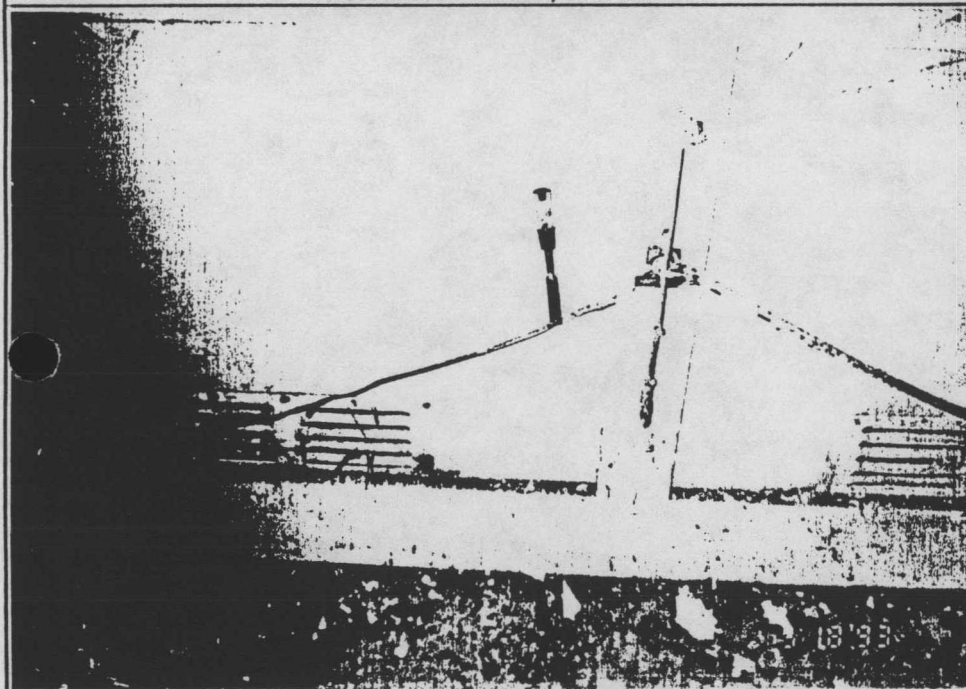
Sample I-3
Exterior window sill by north porch east door



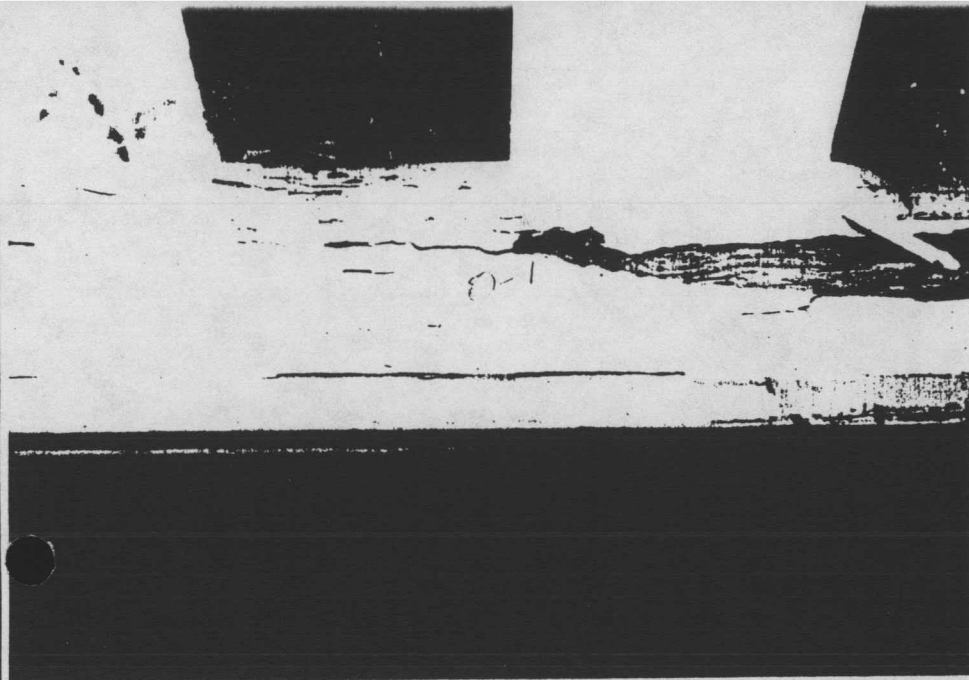
Sample L-1
South room window; exterior well



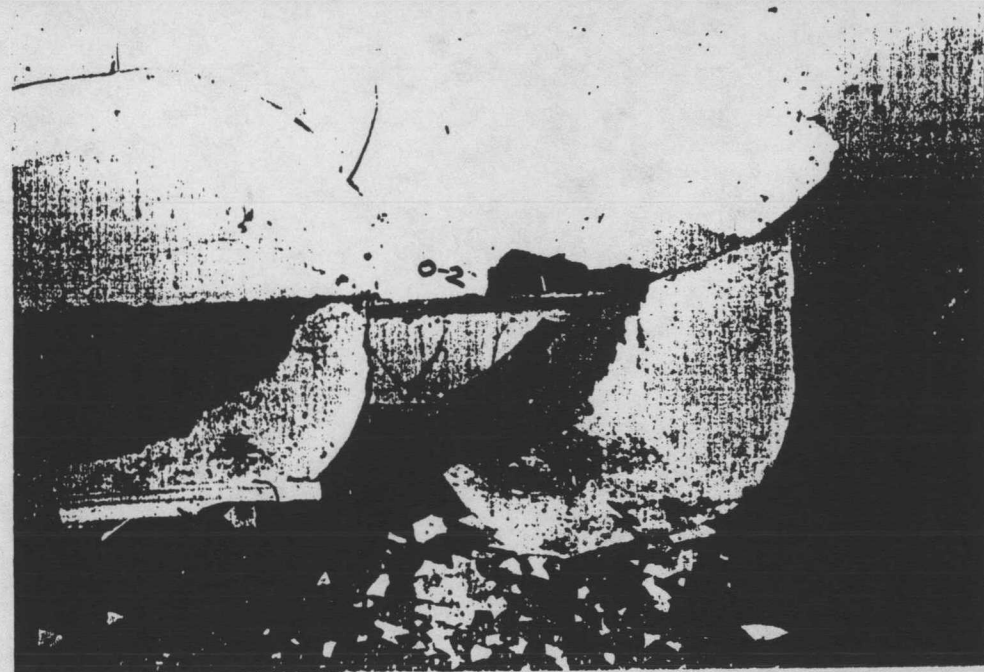
Sample L-2
Front room picture window



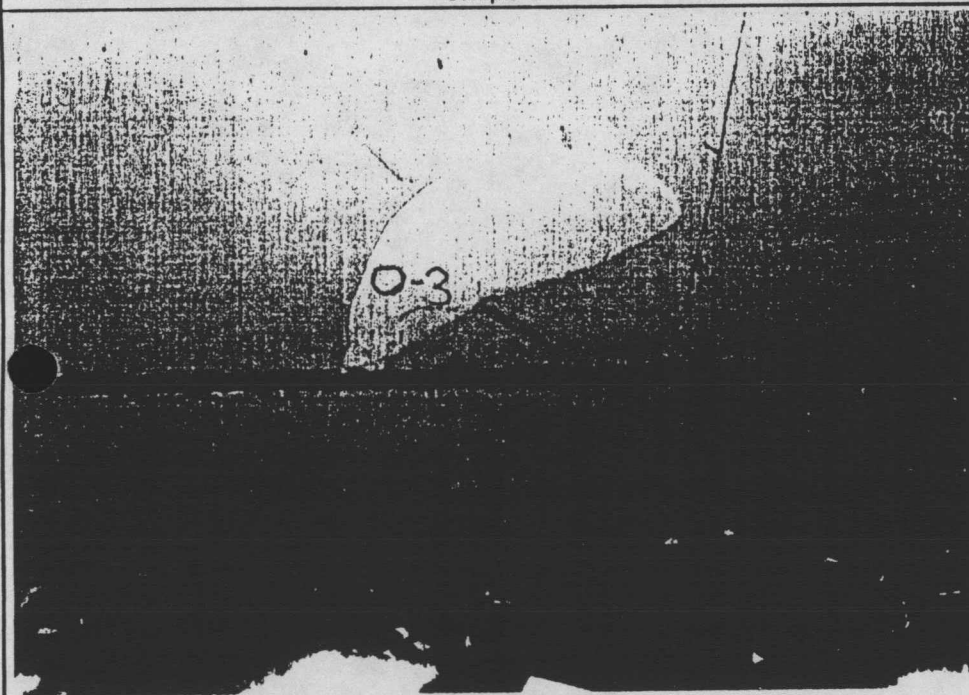
Sample L-3
Garage door; interior



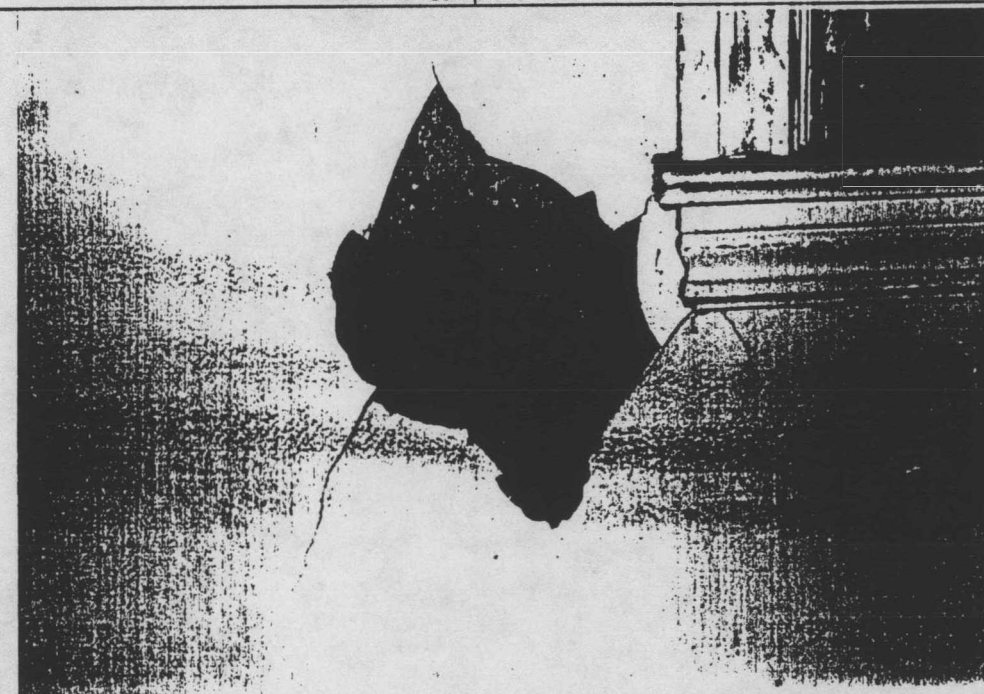
Sample O-1



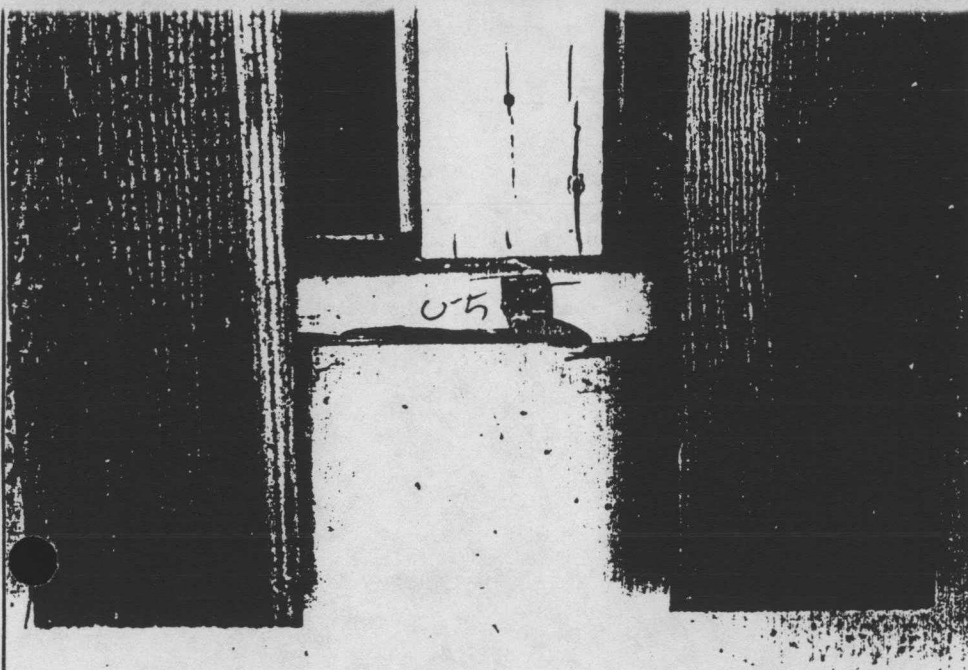
Sample O-2



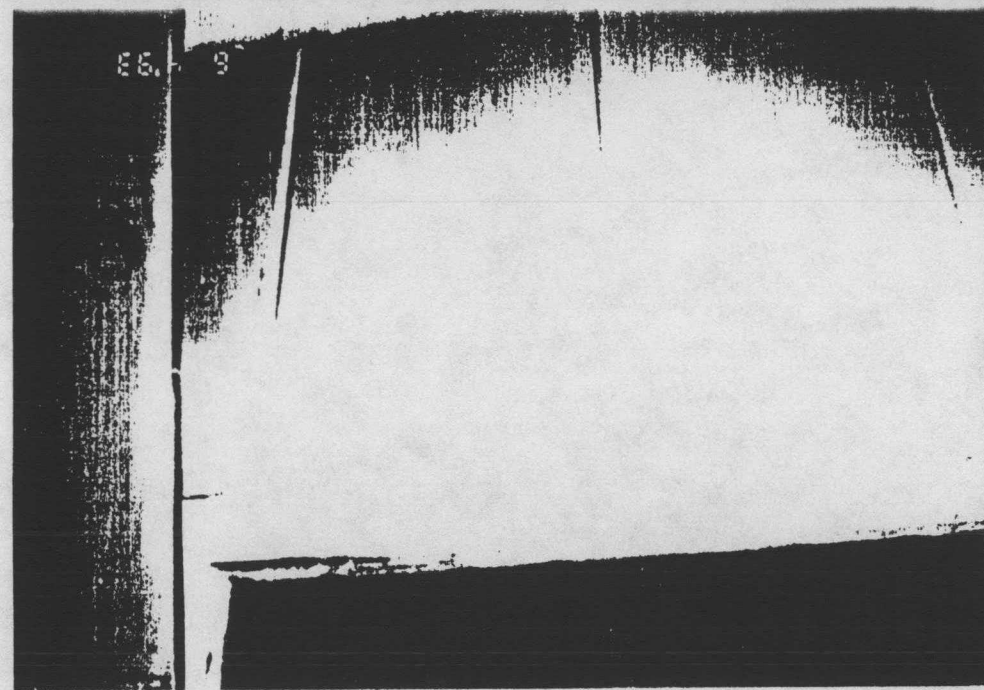
Sample O-3



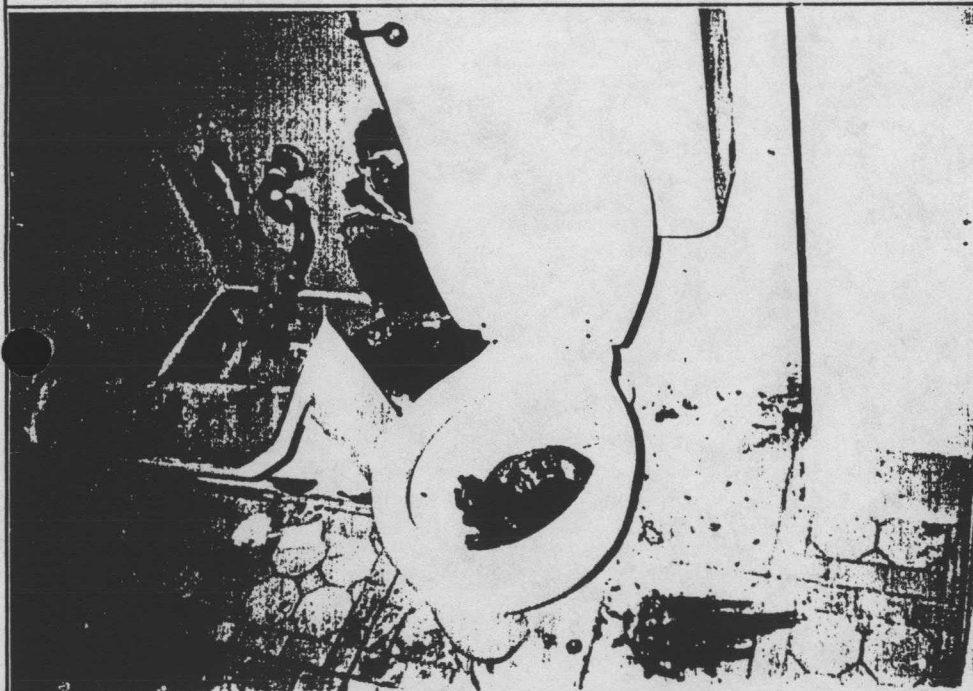
Sample O-4



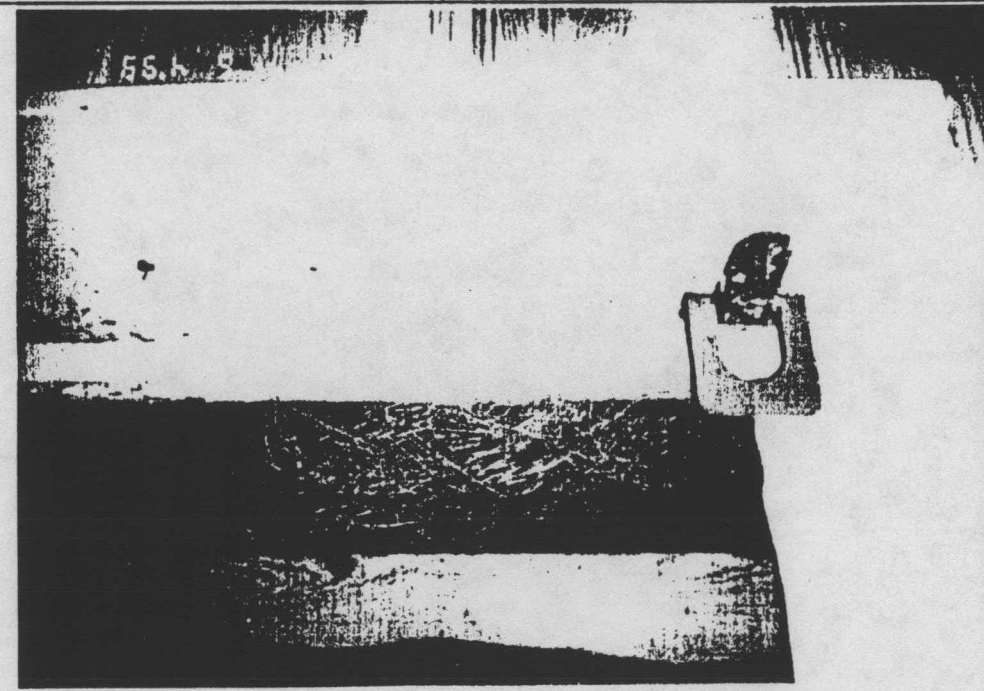
Sample O-5



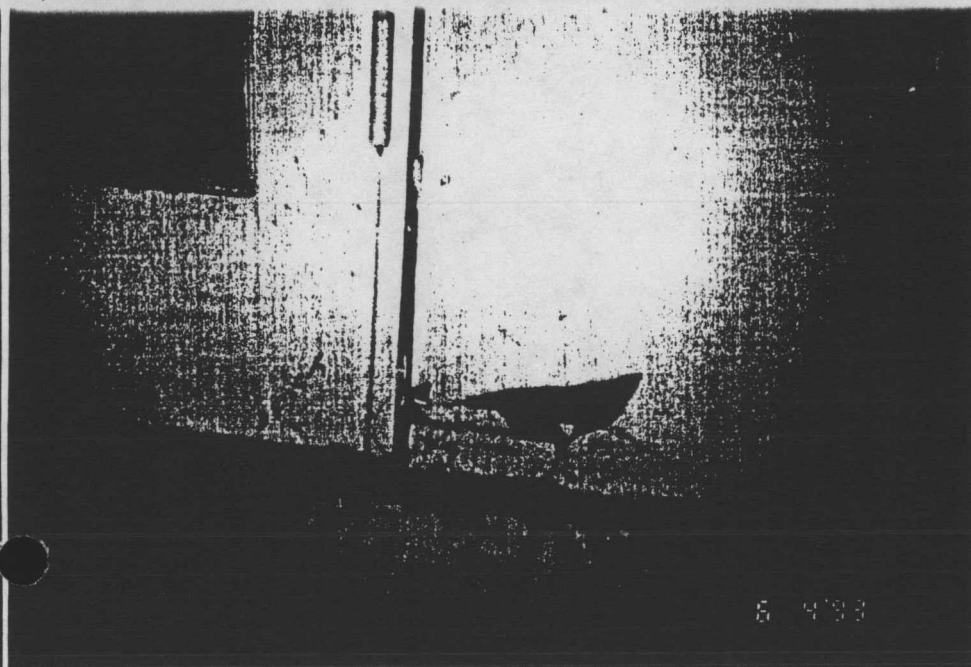
Sample R-105-2



Sample R-105-3



Sample R-105-4

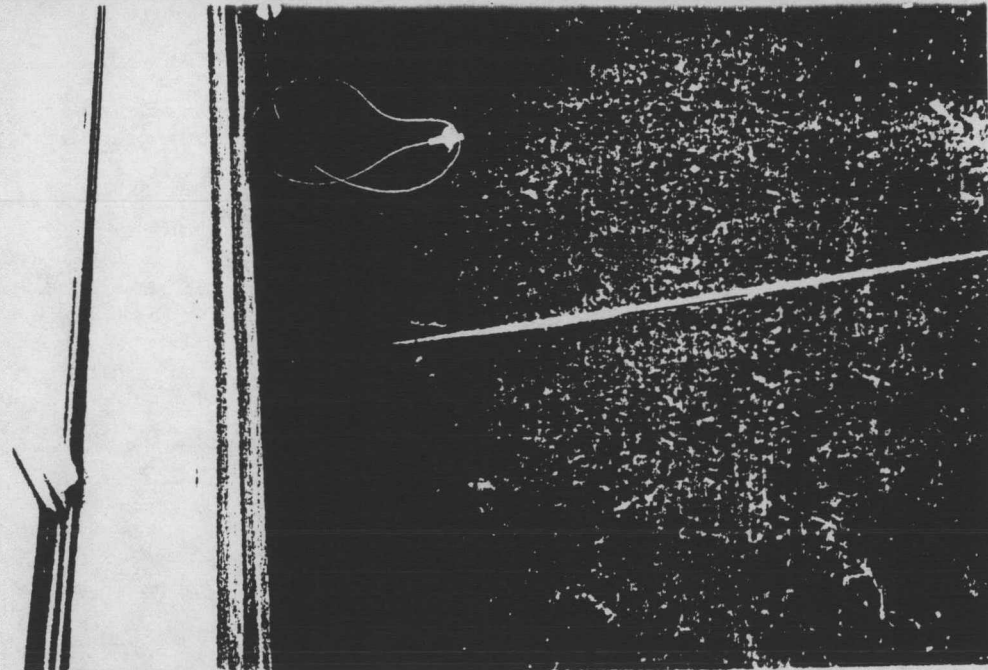


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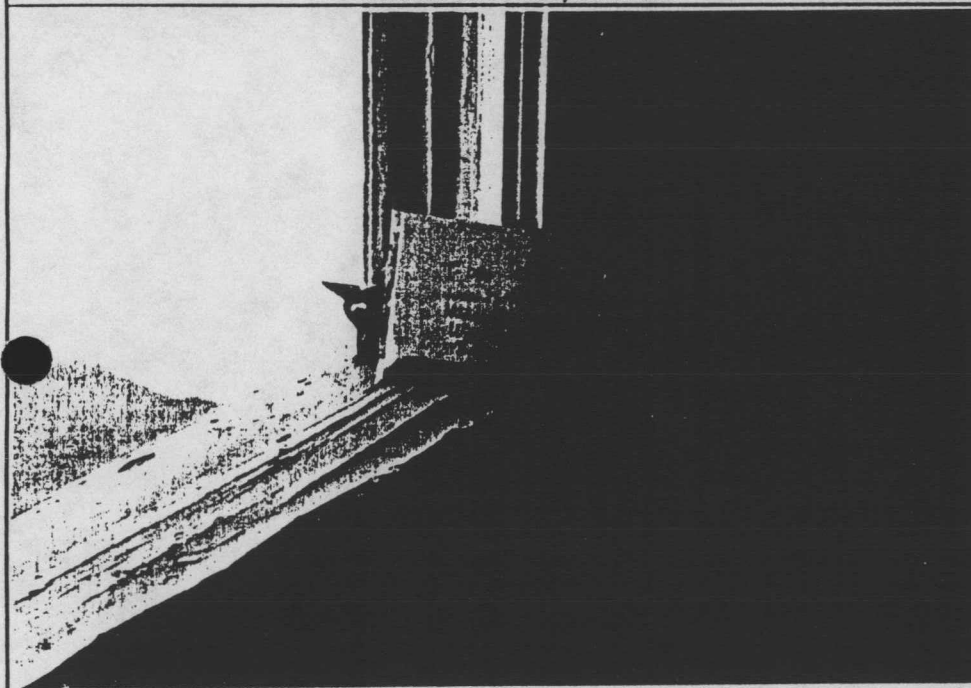
Sample R-105-5



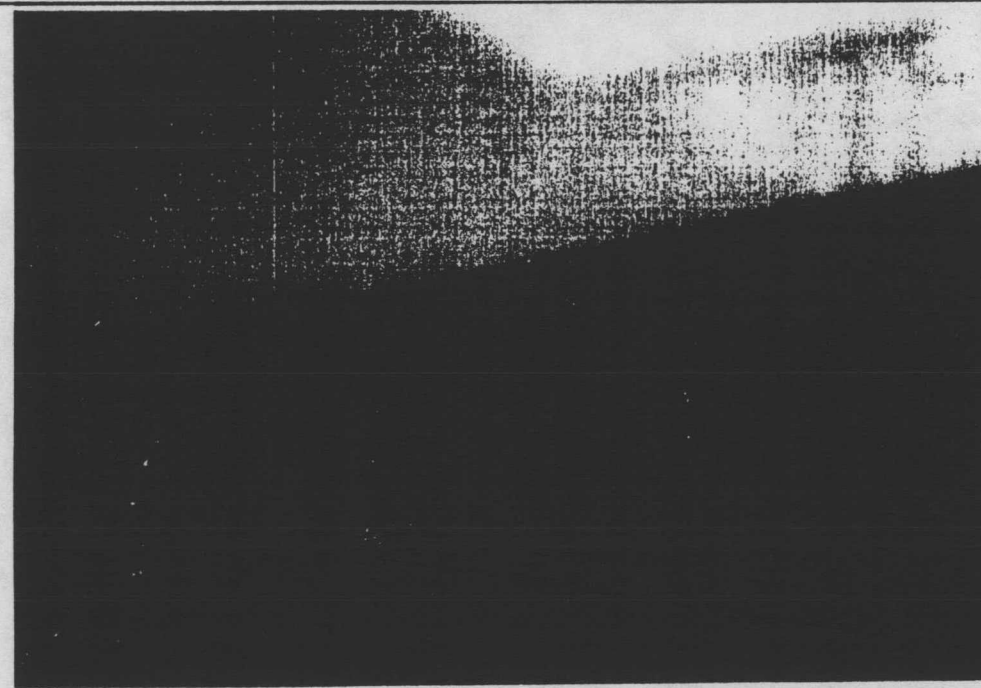
Sample T-1
Kitchen window sill; north end



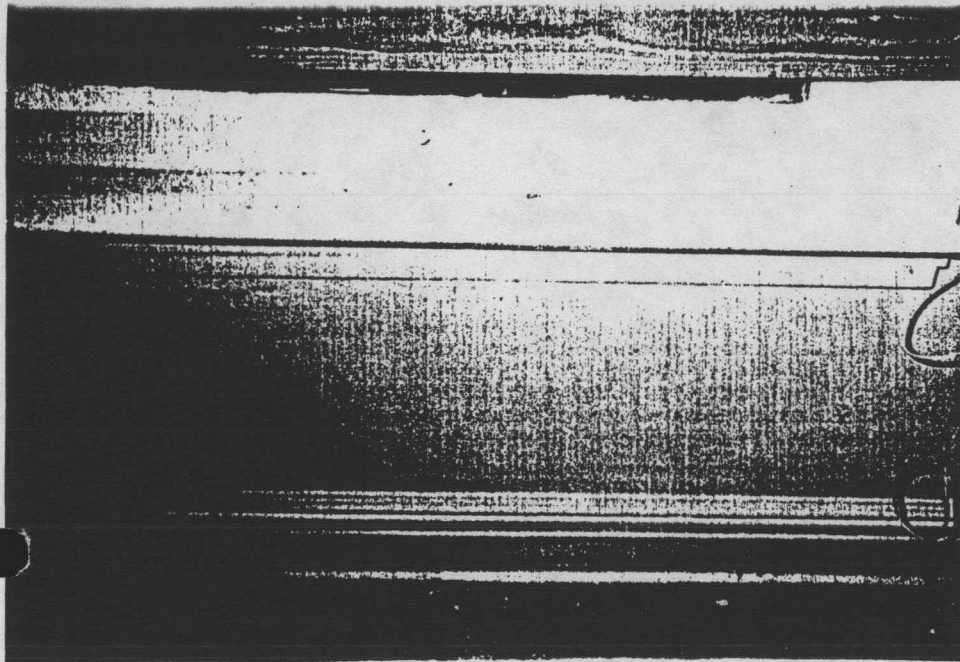
Sample T-2
South bedroom window sill



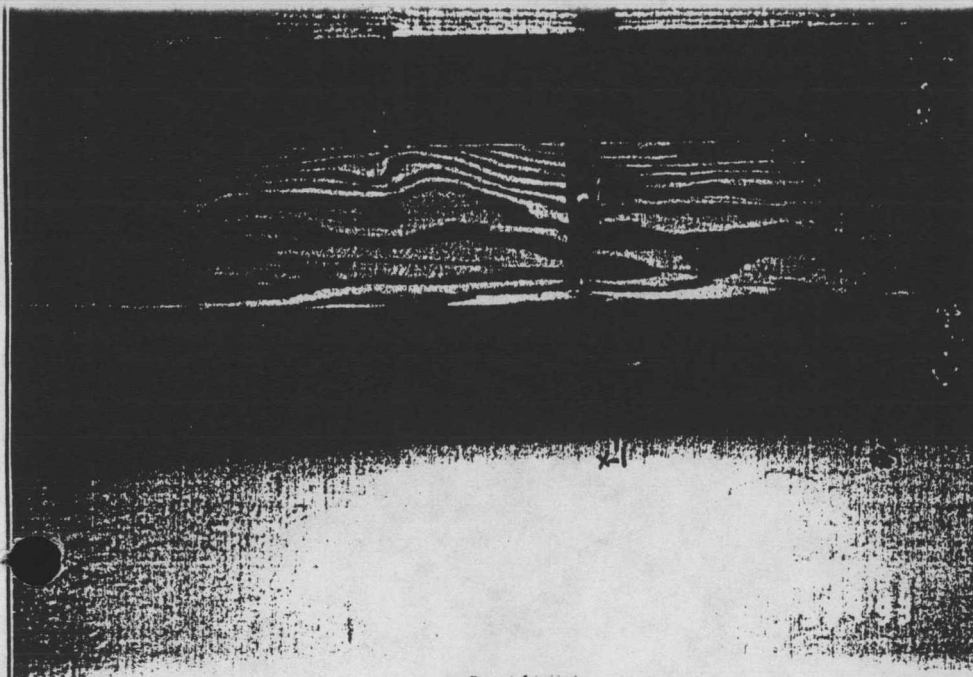
Sample T-3
Middle bedroom window sill



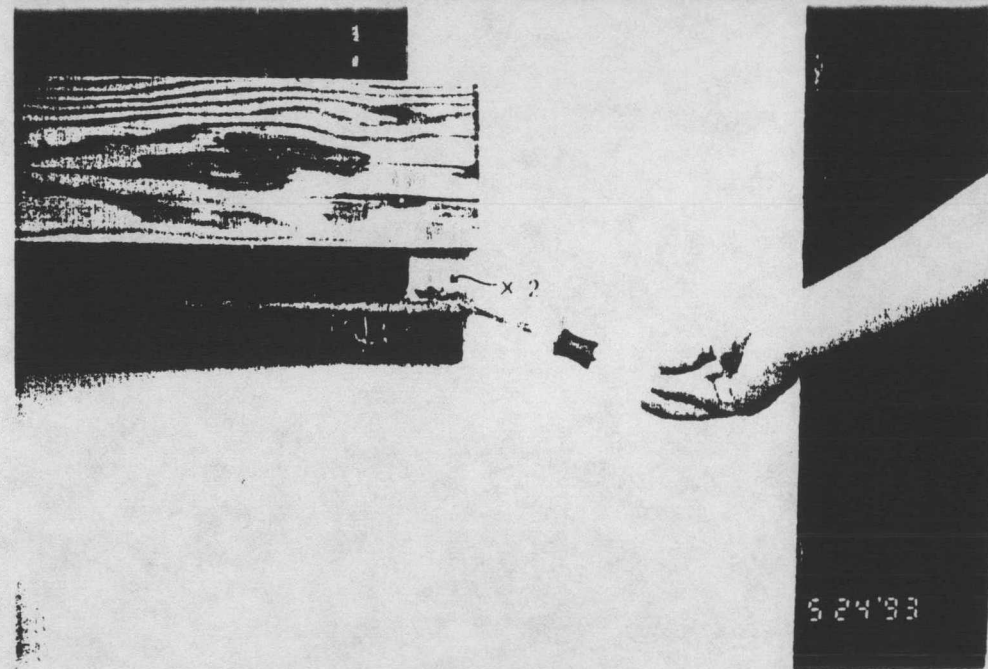
Sample T-4
North bedroom window sill



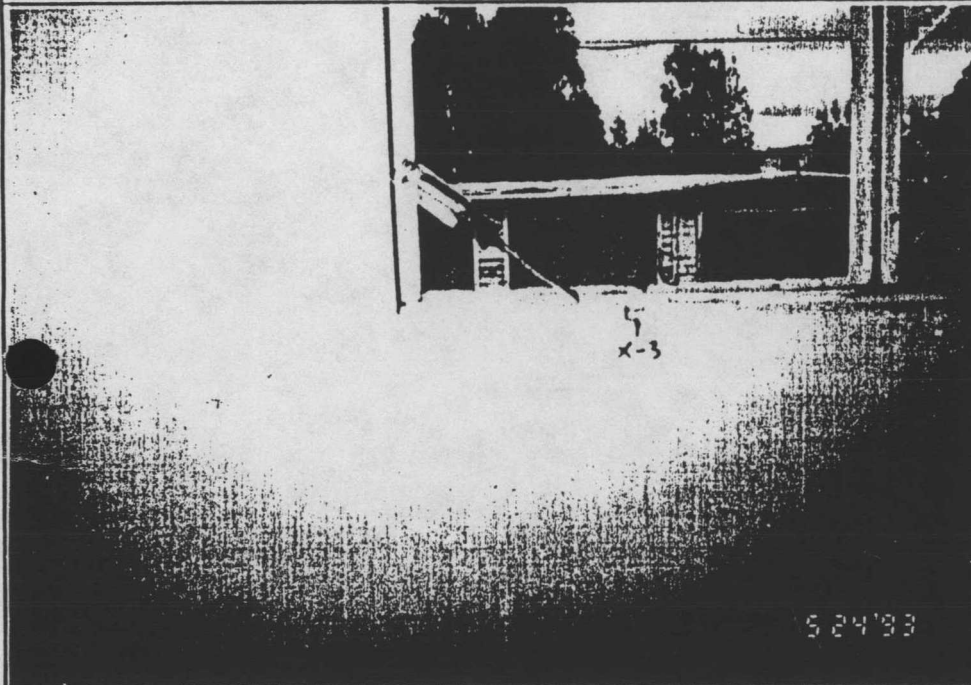
Sample T-5
Dining room window sill



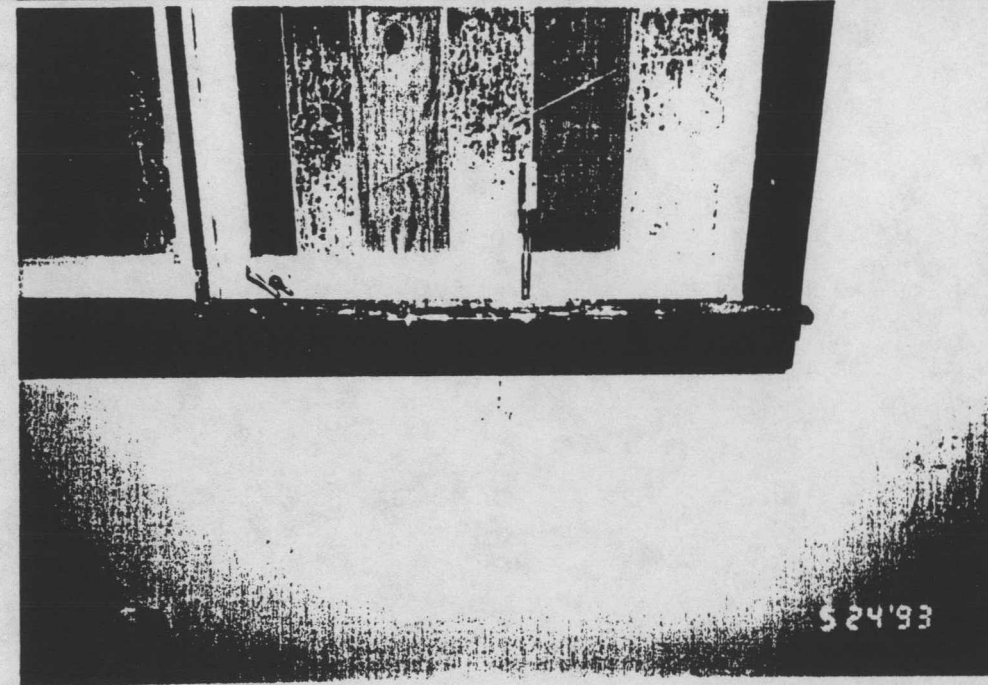
Sample X-1
Rear of house window sill



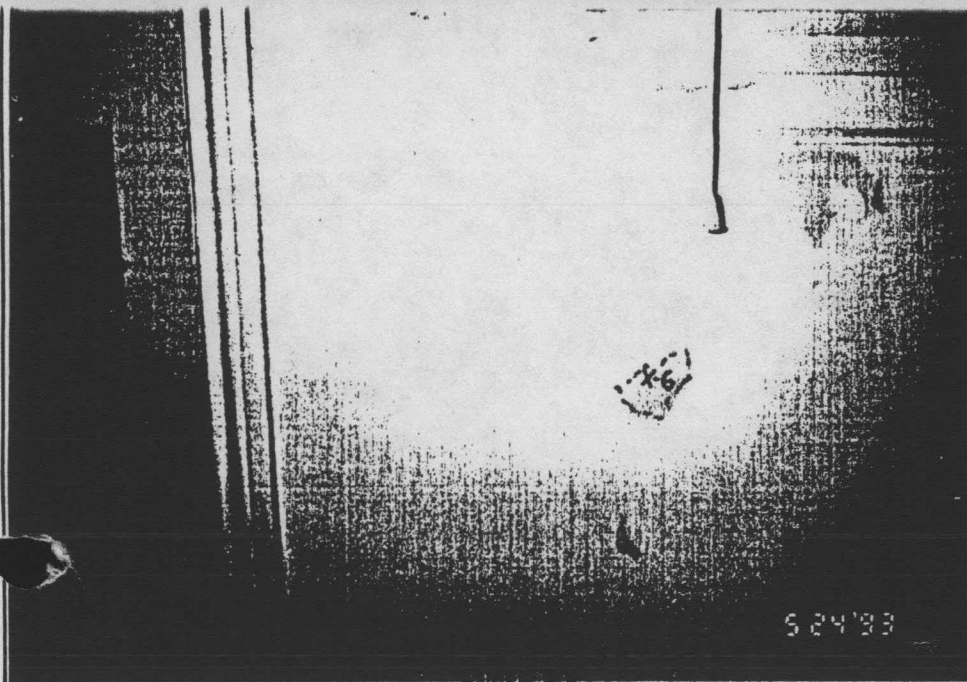
Sample X-2
Rear of house, left of backdoor



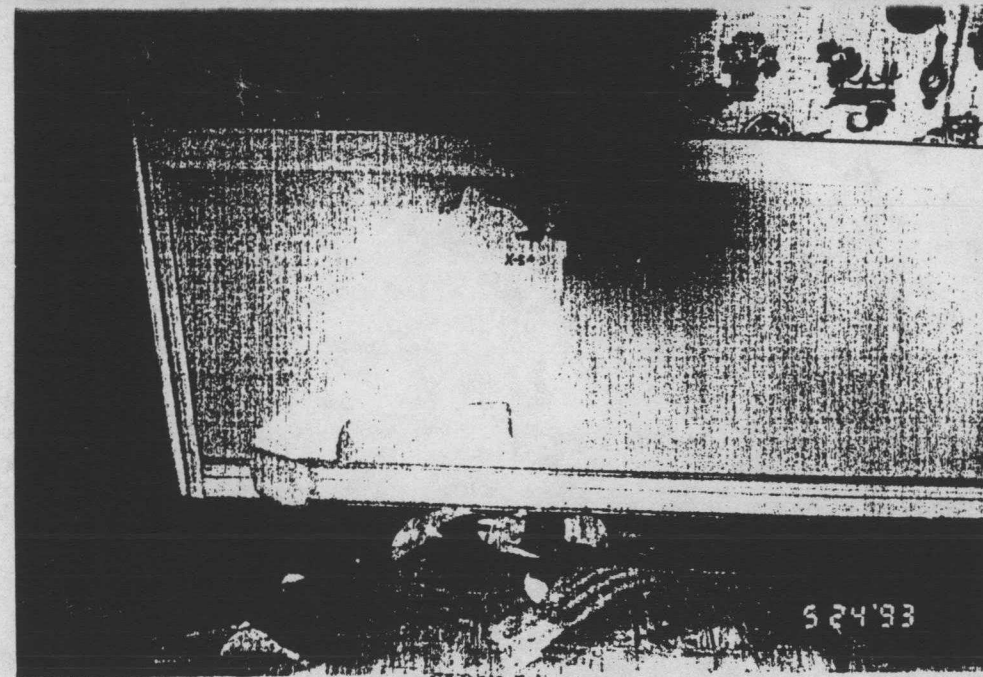
Sample X-3
South Front room window sill



Sample X-4
North rear room window sill



Sample X-5
Kitchen south wall



Sample x-6
Rear porch right of door